Abstracts

A subharmonic self-oscillating mixer with integrated antenna for 60-GHz wireless applications

M. Sironen, Y. Qian and T. Itoh. "A subharmonic self-oscillating mixer with integrated antenna for 60-GHz wireless applications." 2001 Transactions on Microwave Theory and Techniques 49.3 (Mar. 2001 [T-MTT]): 442-450.

A balanced integrated-antenna self-oscillating mixer at 60 GHz is presented in this paper. The modal radiation characteristics of a dual-feed planar quasi-Yagi antenna are used to achieve RF-local oscillator (RF-LO) isolation between closely spaced frequencies. The balanced mixer is symmetric, inherently broad band, and does not need an RF balun. Pseudomorphic high electron-mobility transistors are used in a 30-GHz push-pull circuit to generate the second harmonic and a 30-GHz dielectric resonator was used to stabilize the fundamental oscillation frequency. This allows the possibility of building a balanced low-cost self-contained antenna integrated receiver with low LO leakage for short-range narrow-band communication. Phase locking can be done with half of the RF frequency. The circuit exhibits a conversion loss less than 15 dB from 60 to 61.5 GHz, radiation leakage of -26 dBm at 60 GHz, and IF phase noise of -95 dBc/Hz at 100-kHz offset.

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